

App. No. 10/500,736
Amendment dated June 8, 2007
Reply to Office action of January 8, 2007

AMENDMENTS TO THE DRAWINGS

The attached drawing sheet includes a new figure, Fig. 3, the subject matter of which is fully supported by the specification as filed, for example, at page 5, line 19, and page 8, line 13.

Attachment: New Sheet

REMARKS

Summary of Amendments

Claims 1 and 11-13 have been amended, and claims 9 and 10 have been canceled.

Fig. 3 has been added, a new drawing to illustrate the dimensions in the relationship $D_p = (D_{max} - D_{min})/D_{ave}$ as described in the specification as filed and now recited in claim 1.

The specification has been amended to describe Fig. 3, and to refer to the figure in relevant passages, which themselves provide full support for the amendments to claim 1 and the addition of Fig. 3.

Claim Rejections – 35 U.S.C. § 102/103

Claims 1, 2, 3, 5 and 9-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated, or in the alternative, under 35 U.S.C. § 103(a) as obvious over, U.S. Pat. No. 6,465,763 to Ito et al.

The "Claim Rejections" sections of the current Office action are identical with those of the final Office action, dated May 15, 2006, except that under the § 102 rejections, two phrases are added which are believed to indicate a recognition that the susceptor maximum-minimum outer diameter difference according to the present invention is 0.8% or less *of the average outer diameter* of the wafer-support side.

Namely, at the end of the first paragraph explaining the § 102 rejections, the phrases underlined in the quotation below have been added.

Having such roughness would extend the arbitrary maximum outer diameter to either 150.2 mm or 200.2 mm along the thickness of the susceptor[,] which would yield the diameter difference of [0.]13% or [0.]1%, respectively, with respect [to] the outer diameter having 150 or 200 mm along the susceptor wafer-support side. Since this is the maximum difference, it meets the recited range of [0].8% or less of the average diameter[,] which is less than the maximum diameter, or in [the] alternative, would have been less than the maximum diameter.

The underlined material indicates that the Office recognizes that *Ito et al.* does not explicitly teach susceptor diametric relationships *to the susceptor average diameter*. That is, in the underlined passages in the quotation above, the Office

appears to be making an effort to show that, despite lack of such an explicit teaching, *Ito et al.* nonetheless anticipates the present invention, because the maximum diameter must be greater than the average diameter, and 0.13% or 0.1% of the maximum diameter must be $\leq 0.13\%$ or $\leq 0.1\%$ of the average diameter.

There are two flaws, however, in the foregoing reasoning:

- (1) *Ito et al.* cannot be construed as disclosing, teaching, or suggesting an average diameter for the *Ito et al.* heater plate.
- (2) The side-face surface roughness according to *Ito et al.* is $R_{max} = 0.1$ to $200\ \mu\text{m}$, which is not a range for a single given susceptor, but an acceptable range within which a single roughness value—the maximum value—for the side face of a susceptor according to *Ito et al.* may lie.

Ito et al. mentions substrate diameter only once in the entire disclosure, in column 5, lines 25-27, where the reference states, "The diameter of the ceramic substrate in the ceramic heater of the present invention is desirably over 150 mm and particularly preferably 200 mm or more." But that bald statement cannot be construed as suggesting any specifics as to maximum, minimum, or average diameter.

Moreover, there is no way of knowing from *Ito et al.* what R_{min} is for a given R_{max} , because *Ito et al.* never even mentions any such " R_{min} ." In other words, the Office is reading " $R_{max} = 0.1$ to $200\ \mu\text{m}$ " as though it meant " $R_{min} = 0.1$ and $R_{max} = 200\ \mu\text{m}$."

Nevertheless, the Office simply—and mistakenly—assumes that the side-face roughness stipulated by *Ito et al.* as being from 0.1 to $200\ \mu\text{m}$ means that, for a 200-mm *Ito et al.* heater plate, the side-face minimum diameter is 200.0001 mm, and the maximum diameter is 200.2 mm. Then making another assumption on that mistaken basis—that is, the *mistaken* basis that D_{min} is 200.0001 mm, and D_{max} is 200.2 mm—the Office reasons that the average diameter of such a heater plate must be less than or equal to the maximum diameter, and thus makes the following calculation.

$$\frac{200.2\text{ mm} - 200.0001\text{ mm}}{200.2\text{ mm}_{(\text{max-as-avg})}} = 0.998\% \approx 0.1\%$$

Finally, it is worthy of mention that the entire thrust of the *Ito et al.* reference is toward making the susceptor (heater-plate 11 or 21) cylindrical surface rough enough to keep heat from escaping through the seal ring 37, but not so rough so that the roughness ridges act as cooling fins. (See column 1, lines 63-67 and column 2,

lines 8-14.) The thrust of the technical disclosure of *Ito et al.* is thus entirely away from the subject matter of the present invention as claimed.

In particular, claim 1 has been amended to recite a ceramic susceptor comprising:

a ceramic substrate defining a wafer-support side and being processed so that when the susceptor is not heating, an outer-diameter fluctuation parameter D_p , defined as $D_p = (D_{max} - D_{min})/D_{ave}$, is 0.8% or less, wherein D_{ave} is the average outer diameter of said substrate wafer-support side, D_{max} , the maximum outer diameter along the thickness in an arbitrary plane, and D_{min} , the minimum outer diameter along the thickness in the arbitrary plane; and

a resistive heating element provided either on a surface of or inside said ceramic substrate.

New Fig. 3 specifically illustrates D_p , D_{max} , D_{min} , and D_{ave} . Meanwhile, claim 9, the only other independent claim in this application, has been canceled.

It is respectfully submitted that *Ito et al.* does not anticipate the present invention as now claimed, nor does *Ito et al.* in combination with the knowledge of a person skilled in the art, nor with any prior art of record, render obvious the present invention as now claimed.

For the foregoing reasons, then, it is courteously urged that claim 1 in its current form should be held allowable, and thus the pending claims rejected under this section of the Office action—claims 2, 3, 5 and 11-13—should be held allowable as depending from an allowable base claim.

Claim Rejections – 35 U.S.C. § 103

Claims 4, 6, 7 and 8; Ito et al. '763 in view of Yoshida et al. '970 or Kawada et al. '260

Claims 4, 6, 7 and 8 were rejected as being unpatentable over *Ito et al.* in view of U.S. Pat. No. 6,080,970 to Yoshida et al. or U.S. Pat. No. 5,665,260 to Kawada et al.

Applicants respectfully submit that for the reasons set forth above, independent claim 1 should be held allowable. Inasmuch as claims 4, 6, 7, and 8 depend either directly or indirectly from claim 1, these dependent claims should be held allowable as depending from an allowable base claim.

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Accordingly, Applicant courteously urges that this application is in condition for allowance. Reconsideration and withdrawal of the rejections is requested. Favorable action by the Examiner at an early date is solicited.

Respectfully submitted,

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